



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
[www.uspto.gov](http://www.uspto.gov)

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 09/818,073      | 03/27/2001  | William A. Wojtczak  | 396-CIP             | 9775             |

7590

08/26/2003

Oliver A. Zitzmann  
ATMI, Inc.  
7 Commerce Drive  
Danbury, CT 06810

EXAMINER

UMEZ ERONINI, LYNETTE T

ART UNIT

PAPER NUMBER

1765

DATE MAILED: 08/26/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/818,073

Applicant(s)

WOJTCZAK ET AL.

Examiner

Lynette T. Umez-Eronini

Art Unit

1765

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 6-6-03
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-13 and 40 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-11 and 40 is/are rejected.
- 7) ☒ Claim(s) 12 and 13 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 7.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 112***

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 1, 4, 8, 9, and 13 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 1, "1% and about 21% fluoride source, . . . 20% and about 55 % organic amine, . . . 0.5% and about 40% carboxylic and imines, . . . 23% and about 50% water" is indefinite because it is unclear whether the concentration of the cleaning formulation is based on upon percentage by on weight or by volume of the total or each component of the chemical formulation.

In claims 4, 8, 9, and 13, "said nitrogenous component" lacks antecedent basis.

### ***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of

Art Unit: 1765

the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

5. Claim 1, 2, 4, 6, 8, and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ohmi et al. (US 4,795,582) in view of Ilardi et al. (US 5,466,389).

As pertaining to claim 1, Ohmi teaches, "a surface treating composition . . . which comprises a mixture of hydrofluoric acid, ammonium fluoride solution and water, and at least one compound incorporated in the mixture and selected from the group of surfactants consisting of aliphatic carboxylic acids, salts of aliphatic carboxylic acids, aliphatic amines and aliphatic alcohols" (column 2, lines 19-26). Ohmi further teaches a treating composition, which comprises a mixture of: 15 to 40 % by weight (column 3, lines 36-37) ammonium fluoride (same as applicant's fluoride source), (column 2, lines 19-21) and which encompasses 1-21% by weight fluoride source; an example of surfactants that are used single, or at least two of them in admixture in an amount of 50-ppm to 10,000-ppm (column 3, lines 23-27), which is equivalent to 0.005% to 1% and which is an aliphatic amines (same as applicant's organic amine), (column 2, lines 19, 20, and 22-26); and water (column 2, lines 19, 20, and 22).

Art Unit: 1765

Ohmi differs in failing to teach 0.5% and about 40% carboxylic acids and imines; and a metal chelating agent, in **claim 1**, and a nitrogenous component that is selected from the group as recited in **claims 4, 8, and 9**.

Ilardi teaches a cleaner composition comprising a metal chelating agent such as nitrilotriacetic acid (NTA) (column 4, lines 5-15), which is the same as applicant's nitrogenous component and carboxylic acid and imine and that NTA can be replaced with EDTA (column 65-67), which is present in 0.1% (column 11, lines 24-26) and which reads on and encompasses 0.5% and about 40% carboxylic acids and imines.

It is the examiner's position that it would have been obvious to one having ordinary skill in the art at the time of the claimed invention to modify Ohmi by using Ilardi's carboxylic acids and imines and metal chelating agent for the purpose of increasing the capacity of the formulation to retain metals in solution (Ilardi, column 4, lines 5-8).

Ohmi in view of Ilardi differs in failing to recite the weight percent of water, in **claim 1**:

It is the examiner's position that it would have been obvious to one having ordinary skill in the art at the time of the claimed invention to modify Ohmi in view of Ilardi by varying the concentration of water in a cleaning composition since water is used as a diluent and to make up the based concentration of 100%. Hence, it can be seen that diluting a sample with water results in variation in the concentration of water, thereby making the concentration of water in the formulation a so-called "result effective

Art Unit: 1765

variable," since it has been held that the discovery of an optimum value for result effective variables is within the purviews of routine experimentation by the person of ordinary skill in the art. In re Boesch, 617, F.2d 272, 276, 205 USPQ 215, 219 (CCPA 1980).

Ohmi's composition includes ammonium fluoride (column 2, lines 19-21), which read on said fluoride source as **in claims 2 and 6**.

6. Claims 3 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ohmi in view of Ilardi as applied to claim 1 above, and further in view of Lee (US 5,334,332).

Ohmi ('582) in view of Ilardi ('389) differs in failing to specify one of the said organic amine(s) as recited **in claims 3 and 7**.

Lee teaches a cleaning composition that contains alkanolamines such as triethanolamine (same as applicant's organic amine), (column 7, lines 15-38).

It is the examiner's position that it would have been obvious to one having ordinary skill in the art at the time of the claimed invention to modify Ohmi in view of Ilardi by using the organic amine as taught by Lee for the purpose of reducing metal oxides by complexing the metal with the organic amine, which serves as a ligand (Lee, column 6, line 42-49).

Art Unit: 1765

7. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ohmi ('582) in view of Ilardi ('389) as applied to claim 1 above, and further in view of Wojtczak et al. (WO 98/00244).

Ohmi in view of Ilardi differs in failing to specify at least one of the metal chelating agents as recited in claim 5.

Wojtczak teaches a cleaning solution containing 2,4-pentanedione (Abstract), which is the same as applicant's metal chelating agent (page 2, line 2).

It is the examiner's position that it would have been obvious to one having ordinary skill in the art at the time of the claimed invention to modify Ohmi in view of Ilardi by using the chelating agent as taught by Wojtczak for the purpose removing inorganic residues such as metal oxides (from wafers prior to further fabrication steps (Wojtczak, page 2, lines 5-9 and 23-24).

8. Claims 10 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ohmi (US '582) in view of Ilardi (US '389) as applied to claim 1 above, and further in view of Wojtczak (WO 98/00244) and Hidetoshi et al. (English Translation of JP 09-62013).

Ohmi in view of Ilardi differs in failing to teach the cleaning formulation includes a metal chelating agent having the formula, X-CHR-Y, as in **claim 10** and examples of functional groups that are represented by X, Y, and Z in CHR-Y, in **claim 11**.

Wojtczak teaches a cleaning formulation that contains a chelating agent having the formula comprising CHR-Y (same as applicant X-CHR-Y), (page 2, lines 26 and page 7, lines 4-10, Note: the X-C bond is not shown) and also discloses examples of

Art Unit: 1765

functional groups that are represented by X, Y, and Z in CHR-Y (page 7, lines 8-10), **as in claim 11.**

It would have been obvious to one having ordinary skill in the art at the time of the claimed invention to modify Ohmi in view of Ilardi by using the chelating agent as taught by Wojtczak for the purpose of removing inorganic residues such as metal oxides from wafers prior to further fabrication steps (Wojtczak, page 2, lines 2-9 and 23-24).

Ohmi in view of Ilardi and further in view of Wojtczak differs in failing to teach a cleaning formulation wherein said fluoride source comprises a compound having the general formula  $R_1R_2R_3R_4NF$ , **in claim 10.**

Hidetoshi teaches tetramethylammonium fluoride is used as a cleaning agent for semiconductor devices ([0010]).

It is the examiner's position that it would have been obvious to one having ordinary skill in the art at the time of the claimed invention to modify Ohmi in view of Ilardi and further in view of Wojtczak by using fluoride source that comprises a compound having the general formula  $R_1R_2R_3R_4NF$  as taught by Hidetoshi for the purpose of preventing corrosion of conductive materials on a semiconductor device (Hidetoshi, ([0007])).

9. Claim 40 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ohmi (US '582) in view of Ilardi (US '389).



Art Unit: 1765

Ohmi teaches, "a surface treating composition . . . which comprises a mixture of hydrofluoric acid, ammonium fluoride solution and water, and at least one compound incorporated in the mixture and selected from the group of surfactants consisting of aliphatic carboxylic acids, salts of aliphatic carboxylic acids, aliphatic amines and aliphatic alcohols" (column 2, lines 19-26). The aforementioned reads on,

A wafer formulation, including (i) a fluoride source, (ii) at least one organic amine, and (iv) water.

Ohmi differs in failing to teach (iii) a nitrogen-containing carboxylic acid or an imine, and a metal chelating agent.

Ilardi teaches a cleaner composition comprising a metal chelating agent such as nitrilotriacetic acid (NTA) (column 4, lines 5-15), which is also the same as applicant's nitrogen-containing carboxylic acid or an imine.

It is the examiner's position that it would have been obvious to one having ordinary skill in the art at the time of the claimed invention to modify Ohmi by using Ilardi's metal chelating agent that is also the same as applicant's nitrogen-containing carboxylic acid or an imine for the purpose of increasing the capacity of the formulation to retain metals in solution (Ilardi, column 4, lines 5-8).

#### ***Allowable Subject Matter***

10. Claims 12 and 13 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Art Unit: 1765

***Conclusion***

11. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lynette T. Umez-Eronini whose telephone number is 703-306-9074. The examiner is normally unavailable on the First Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine Norton can be reached on 703-305-2667. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Application/Control Number: 09/818,073

Page 10

Art Unit: 1765

ltue

August 14, 2003

**NADINE G. NORTON**  
**PRIMARY EXAMINER**

A handwritten signature in cursive script, appearing to read "Nadine", written in black ink.